

# Integrated Criminal Justice Information System (ICJIS) Charge Standardization Project – Phase 1 (CSP1)



2-D Bar Codes (Draft: January 30, 2002)

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## Introduction

With any project or undertaking the size and complexity of the Integrated Criminal Justice Information System and specifically the Charge Standardization Project – Phases 1a and 1b, there are complexities inherent with the sharing of data. Through careful design, planning, coordination and implementation, these complexities can be drastically reduced. The use of 2-D Bar Codes, in the PDF417 Symbolology (format), will work well for the initial sharing of data between agencies. Additionally, the 2-D Bar Codes will compliment the electronic interfaces once those electronic interfaces are in place and operational.

By capturing complete warrant/summons, bail/surety and commitment information in the form of 2-D Bar Codes, which could be printed on a separate attachment, any agency “down line” from the Magistrate in the process will be able to receive and capture this data without the need for re-entry (redundant keying) of data. This will reduce data entry time and reduce data entry errors.

During the jail intake portion of the booking process, it is estimated that for the 498,000 arrests in the Commonwealth of Virginia during 1998, there were **565 Million** keystrokes required to enter redundant data. This is data that had been entered once in the Magistrate’s system and then repeatedly re-keyed into subsequent systems. This equates to about 314,000 person hours or **\$3.85 Million** in base salaries today. The use of 2-D Bar Codes, and later the electronic interfaces, will eliminate the need for this redundant data entry.

## What is a 2-D Bar Code?

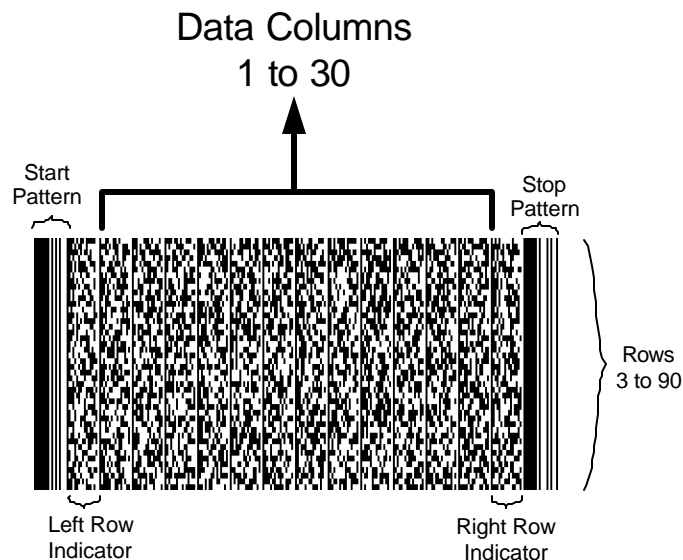
Conventional bar codes are referred to as one-dimensional symbols, because, when read, it is only the **width** of the **bars and spaces** that is taken into account. The height of the bars is only to give the symbol some built-in redundancy. Typical bar code symbols, therefore, are read in only one dimension (1-D).

The one dimension bar code does not contain any actual data. The data encoded in the bar code is a key field or “license plate” and additional information about the object marked with the bar code is held off-line in a database record. The coded data is a pointer to the actual business data.

Two dimensional (2-D) bar code is a generic term used to refer to a bar code which encodes its data in both the height and width (2 dimensions) of the symbol. The amount of data that can be contained in a single symbol is significantly greater than that stored in a one-dimensional symbol.

**PDF417** is a 2D variable length symbology that can encode virtually any letter, number, or character. Each character consists of 4 bars and 4 spaces in a 17 module structure. The name of the symbol is derived from the format of the code. PDF stands for "Portable Data File" and "417" is derived from the module structure. Each PDF417 symbol consists of 3 to 90 stacked rows surrounded by a quiet zone on all four sides. Each row consists of a leading quiet zone, start pattern, left row indicator character, one to thirty data characters, right row indicator character, stop pattern, and trailing quiet zone. PDF417 supports text compaction, numeric compaction, and byte compaction that correlate the mapping between codeword values and decoded data.

# PDF417 Anatomy



**Start and stop patterns** are used to delineate where a PDF417 begins and ends and makes reading of symbols bi-directional.

**Row indicators** are located on the left and right side. The row indicators contain information on number of rows, number of columns and the error correction level.

**Data Columns** are where data and error correction information are located. Data columns are flexible and can be between 1 and 30.

**Rows** are variable; can be between 3 and 90. Row height, or Y dimension, is user selectable. Recommended Y dimension is 3X.

## **Capacity**

While a linear (1-D) bar code might encode as many as 30 characters in its symbol, a 2-D bar code can store almost two thousand ASCII characters in a relatively small space. The main advantage of using 2D bar codes is that potentially large amounts of data can "ride" with the item or person to which it is attached or applies. PDF417 can accommodate up to 340 characters per square inch with a maximum data capacity of 1850 text characters. For numerical digits, the maximum is 2,725.

## **Accuracy and Security:**

Another aspect of 2-D symbols is their potential durability. 2-D bar codes are able to sustain considerable damage and still maintain readability. To sabotage the readability of a 1D symbol, you only have to add another bar to the beginning or end of the symbol or draw a line through the symbol, parallel to the stripes. This throws off the checks and balances built into the decoding algorithms of a 1D decoder and make the symbol unreadable.

A 2-D bar code can be used to encode full ASCII, numeric or binary data and it uses sophisticated error correction algorithms to keep intact 100 percent of the data; even when as much as half the symbol is damaged. And it is self-verifying, so data errors can be detected and data integrity maintained.

## **Near Term Benefits:**

Within the scope of CSP-1, 2-D Bar Codes have the following near term benefits:

1. Improvement in data quality in many local agency systems by reducing data entry errors.
2. Local agencies should realize a reduction in data entry time and redundancy
3. Minor or no changes to existing Magistrate forms required
4. Complete information contained on a warrant/summons along with updated information obtained by a Magistrate can be easily passed to other agencies "down line" from the Magistrate's office to:
  - a. Live-Scan
  - b. Jail Intake
  - c. Courts
  - d. Local Police/Sheriff's Offices Records Management
5. Low initial equipment and software costs
6. Minimal user training time
7. Minimal programming time
8. Data can be shared using the paper media until an electronic infrastructure can be established in CSP-2
9. Use of the 2-D Bar Codes in CSP Phase 2 will also have benefits for the Commonwealth's Attorneys and Public Defenders

10. Creation of the 2-D Bar Codes can be done in the “background” by the Magistrate’s system as a process transparent to the user.

### **Limitations:**

1. The amount of Text that can be encoded in one bar code is limited to 1,850 ASCII characters
2. This remains a “paper” process and is therefore, NOT real-time
3. The 2-D Bar Code can become damaged and thus unreadable
4. The 2-D Bar Code, if an attachment to a warrant, can become detached
5. Multiple Bar Codes are required to convey all of the necessary data

### **Standard for the 2-D Bar Code:**

Each program, or successive station, in the criminal justice process, must be able to accurately process the data contained within a 2-D Bar Code. To accomplish this, it is necessary to establish standards that define the data and its placement within that bar code. The following is a list of illustrative data elements currently found on or proposed for Warrants and/or Summons, Bail, Surety, Commitment Orders. Standards should be established for these, and other elements deemed necessary or beneficial, to enable the various program languages and platforms to accurately “read” the 2-D Bar Code.

#### **1. Bar Code Record Type**

The first field in each Bar Code would indicate what type of data is contained within that bar code. As a result of the 1,850 ASCII Character limit per Bar Code, this proposal recommends the production of at least three Bar Codes types for each arrest, broken down as follows:

- a. Offender – The Bar Code contains information pertaining to the offender as found on the warrant and commitment order
- b. Surety – The Bar Code contains information pertaining to Bail, Sureties and the Commitment Order
- c. Charge001-999 – The Bar Code contains information pertaining to the charge as found on the warrant. There would be one Bar Code for each charge.

#### **2. Data Element or Field Separator**

This indicates a new data element is to follow and the current field is terminated. The Data Element Separator used in this illustration is the Semi Colon character (“;” ASCII/ISO 646 Decimal “059”) (ASCII/ISO 646 Hex “3B”). The Data Element or Field Separator selected should be standardized and generally not present in normal text. The Data Element or Field Separator should be produced (or output) for every field, regardless of whether or not that field is populated with data.

### 3. Data Elements – Offender Information

Data Element	Max Length	Field Number
Bar Code Record Type	9	1
State ID Number (SID)	15	2
Accused Last Name	25	3
Accused First Name	12	4
Accused Middle Name	12	5
Accused Address – Street or POB	34	6
Accused Address – City	20	7
Accused Address – State	2	8
Accused Address – Zip	15	9
Accused Address – Country	3	10
Accused Mail Address – Street or POB	34	11
Accused Mail Address – City	20	12
Accused Mail Address – State	2	13
Accused Mail Address – Zip	15	14
Accused Mail Address – Country	3	15
Accused Race	1	16
Accused Sex	1	17
Accused Date of Birth (YYYYMMDD)	8	18
Accused Height (Feet Inches)	3	19
Accused Weight	3	20
Accused Eyes	2	21
Accused Hair	2	22
Accused Social Security Number	9	23
Operators License Number	13	24
Accused Telephone	22	25
Adult or Juvenile	1	26
Custodian Name	30	27
Custodian Address – Street or POB	34	28
Custodian Address – City	20	29
Custodian Address – State	2	30
Custodian Address – Zip	15	31
Total Characters	372	

#### 4. Data Elements – Bond/Sureties/Commitment Information

Data Element	Max Length	Field Number
Bar Code Record Type	9	1
Document Number	15	2
Surety 1 Name	50	3
Surety Address – Street	34	4
Surety Address – City	30	5
Surety Address – State	2	6
Surety Address – Zip	15	7
Surety 1 SSN	9	8
Permitted to leave Virginia	1	9
Bond Amount	8	10
Bond Type	1	11
Eligible for Bail	1	12
Surety 2 Name	50	13
Surety 2 Address – Street or POB	34	14
Surety 2 Address – City	20	15
Surety 2 Address – State	2	16
Surety 2 Address – Zip	15	17
Surety 2 SSN	9	18
Surety 3 Name	50	19
Surety 3 Address – Street or POB	34	20
Surety 3 Address – City	20	21
Surety 3 Address – State	2	22
Surety 3 Address – Zip	15	23
Surety 3 SSN	9	24
Bond / Cash	1	25
Bond Surety	1	26
Bond-Professional Bond	1	27
Bond Other	1	28
Assert	195	29
Except	195	30
Bond Condition	195	31
Total Characters	1,024	

## 5. Data Elements – Charge Information

Data Element	Max Length	Field Number
Bar Code Record Type	9	1
Offense Tracking Number (OTN)	15	2
Jurisdiction (City / County)	30	3
Court	3	4
Court Name	50	5
Court Address – Street or POB	34	6
Court Address – City	20	7
Court Address – State	2	8
Court Mail Address – Zip	15	9
Hearing Court Type	1	10
Offense Date (YYYYMMDD)	8	11
Offense Date 2 (YYYYMMDD)	8	12
Offense Code Section	15	13
Offense Code Section Local	15	14
Class	1	15
Locality Type	1	16
Short Description (Of offense)	30	17
Long Description (Of Offense)	800	18
Warrant Date (YYYYMMDD)	8	19
Complainant Name	50	20
Complainant Number	5	21
Case Number	15	22
Hearing Date (YYYYMMDD)	8	23
Hearing Time (HHMM)	4	24
Place Detained	30	25
Arresting Officer Name	50	26
Attorney for Accused (Name)	50	27
EPO Property Address – Street	34	28
EPO Address – City	30	29
EPO Address – State	2	30
EPO Address – Zip	15	31
Total Characters	1,358	

## Sample 2-D Bar Code

The following is an example of what the data stream would look like in a 2D symbol printed in accordance with the standard illustrated here and containing the following test information:

### Offender Bar Code Record:

Offender;;Public;John;Q;123 Any Street;Richmond;VA;232231122;;123 Any Street;Richmond;VA;232231122;;W;M;19601201;510;200;BL;BW;123456789;123456789ABCD;8046466400;A;;;;;

### Bail/Sureties/Commitment Bar Code Record:

Surety;123456789abcdef;Johnny R Gotrocks;123 Easy Street;Richmond;VA;23223;123654987;N;1000000;S;Y;;;;;;;;;;;;;;;;;

### Charge Bar Code Record:

Charge001;760L01231101087;Richmond City;GDC;;10th and Decatur St;Richmond;VA;232211122;C;20010918;;18.2-48H1;;F;C;Possession of Marijuana with intent to distribute;Any person who was the principal or one of several principal administrators, organizers or leaders of a continuing criminal enterprise shall be guilty of a felony if (i) the enterprise received at least \$100,000 but less than \$250,000 in gross receipts during any twelve-month period of its existence from the manufacture, importation, or distribution of heroin or cocaine or ecgonine or methamphetamine or the derivatives, salts, isomers, or salts of isomers thereof or marijuana or (ii) the person engaged in the enterprise to manufacture, sell, give, distribute or possess with the intent to manufacture, sell, give or distribute the following during any twelve-month period of its existence;20010921;;12345;123456789abcdef;20010924;0900;Richmond City Lockup;Oakly, Annie P;Bailum, Get Um;;;;;

Charge002;760L0123110111H;Richmond City;GDC;;10th and Decatur St;Richmond;VA;232211122;C;20010918;;18.2-51.2b;;F;C;Malicious Wounding;Maliciously shoot, stab, cut or wound any other woman who is pregnant, or by any other means cause bodily injury, with the intent to maim, disfigure, disable or kill the pregnant woman or to cause the involuntary termination of her pregnancy;20010921;;12346;123456789abcdf;20010924;0900;Richmond City Lockup;Oakly, Annie P;Bailum, Get Um;;;;;

Charge003;760L0123110112M;Richmond City;GDC;;10th and Decatur St;Richmond;VA;232211122;C;20010918;;18.2-92;;F;C;Breaking and Entering;Breaking and entering dwelling house with intent to commit other misdemeanor. Breaking and entering a dwelling house while said dwelling is occupied, either in the day or nighttime, with the intent to commit any misdemeanor except assault and battery or trespass;20010921;;12347;123456789abcfde;20010924;0900;Richmond City Lockup;Oakly, Annie P;Bailum, Get Um;;;;;



This data, when broken down further, can be better understood as:

### Offender Information:

Field Name	Contents	Separator	Field #
Bar Code Record Type	Offender	;	1
State ID Number (SID)	blank	;	2
Accused Last Name	Public	;	3
Accused First Name	John	;	4
Accused Middle Name	Q	;	5
Accused Address – Street or POB	123 Any Street	;	6
Accused Address – City	Richmond	;	7
Accused Address – State	VA	;	8
Accused Address – Zip	232231122	;	9
Accused Address – County	Blank	;	10
Accused Mail Address – Street or POB	123 Any Street	;	11
Accused Mail Address – City	Richmond	;	12
Accused Mail Address – State	VA	;	13
Accused Mail Address – Zip	232231122	;	14
Accused Mail Address – County	Blank	;	15
Accused Race	W	;	16
Accused Sex	M	;	17
Accused Date of Birth (YYYYMMDD)	19601201	;	18
Accused Height (Feet Inches)	510	;	19
Accused Weight	200	;	20
Accused Eyes	BL	;	21
Accused Hair	BW	;	22
Accused Social Security Number	123456789	;	23
Operators License Number	123456789ABCD	;	24
Accused Telephone	8046466400	;	25
Adult or Juvenile	A	;	26
Custodian Name	Blank	;	27
Custodian Address – Street or POB	Blank	;	28
Custodian Address – City	Blank	;	29
Custodian Address – State	Blank	;	30
Custodian Address – Zip	Blank	;	31

**Bail/Sureties/Commitment Information:**

Field Name	Contents	Separator	Field #
Bar Code Record Type	Surety	;	1
Document Number	123456789abcdef	;	2
Surety 1 Name	Johnny Gotrocks	;	3
Surety 1 Address – Street	123 Easy Street	;	4
Surety 1Address – City	Richmond	;	5
Surety 1 Address – State	VA	;	6
Surety 1Address – Zip	23223	;	7
Surety 1 SSN	123654987	;	8
Permitted to leave Virginia	N	;	9
Bond Amount	1000000	;	10
Bond Type	S	;	11
Eligible for Bail	Y	;	12
Surety 2 Name	Blank	;	13
Surety 2 Address – Street or POB	Blank	;	14
Surety 2 Address – City	Blank	;	15
Surety 2 Address – State	Blank	;	16
Surety 2 Address – Zip	Blank	;	17
Surety 2 SSN	Blank	;	18
Surety 3 Name	Blank	;	19
Surety 3 Address – Street or POB	Blank	;	20
Surety 3 Address – City	Blank	;	21
Surety 3 Address – State	Blank	;	22
Surety 3 Address – Zip	Blank	;	23
Surety 3 SSN	Blank	;	24
Bond / Cash	Blank	;	25
Bond Surety	Blank	;	26
Bond-Professional Bond	Blank	;	27
Bond Other	Blank	;	28
Assert	Blank	;	29
Except	Blank	;	30
Bond Condition	Blank	;	31

**Charge001 Information:**

Field Name	Contents	Separator	Field #
Bar Code Record Type	Charge001	;	1
Offense Tracking Number (OTN)	760L01231101087	;	2
Jurisdiction (City / County)	Richmond City	;	3
Court	GDC	;	4
Court Name	Blank	;	5
Court Address – Street or POB	10th and Decatur Streets	;	6
Court Address – City	Richmond	;	7
Court Address – State	VA	;	8
Court Mail Address – Zip	232211122	;	9
Hearing Court Type	C	;	10
Offense Date (YYYYMMDD)	20010918	;	11
Offense Date 2 (YYYYMMDD)	Blank	;	12
Offense Code Section	18.2-48H1	;	13
Offense Code Section Local	Blank	;	14
Class	F	;	15
Locality Type	C	;	16
Short Description (Of offense)	Possession of Marijuana (etc)	;	17
Long Description (Of Offense)	Any person who was the (etc)	;	18
Warrant Date (YYYYMMDD)	20010921	;	19
Complainant Name	Blank	;	20
Complainant Number	12345	;	21
Case Number	123456789ABCDEF	;	22
Hearing Date (YYYYMMDD)	20010924	;	23
Hearing Time (HHMM)	0900	;	24
Place Detained	Richmond City Lock Up	;	25
Arresting Officer Name	Oakley, Annie P	;	26
Attorney for Accused (Name)	Bailum, Get Um	;	27
EPO Property Address – Street	Blank	;	28
EPO Address – City	Blank	;	29
EPO Address – State	Blank	;	30
EPO Address – Zip	Blank	;	31

**Charge002 Information:**

Field Name	Contents	Separator	Field #
Bar Code Record Type	Charge002	;	1
Offense Tracking Number (OTN)	760L0123110111H	;	2
Jurisdiction (City / County)	Richmond City	;	3
Court	GDC	;	4
Court Name	Blank	;	5
Court Address – Street or POB	10th and Decatur Streets	;	6
Court Address – City	Richmond	;	7
Court Address – State	VA	;	8
Court Mail Address – Zip	23221122	;	9
Hearing Court Type	C	;	10
Offense Date (YYYYMMDD)	20010918	;	11
Offense Date 2 (YYYYMMDD)	Blank	;	12
Offense Code Section	18.2-51.2B	;	13
Offense Code Section Local	Blank	;	14
Class	F	;	15
Locality Type	C	;	16
Short Description (Of offense)	Malicious Wounding	;	17
Long Description (Of Offense)	Maliciously shoot, stab, cut (etc)	;	18
Warrant Date (YYYYMMDD)	20010921	;	19
Complainant Name	Blank	;	20
Complainant Number	12346	;	21
Case Number	123456789ABCDFE	;	22
Hearing Date (YYYYMMDD)	20010924	;	23
Hearing Time (HHMM)	0900	;	24
Place Detained	Richmond City Lock Up	;	25
Arresting Officer Name	Oakley, Annie P	;	26
Attorney for Accused (Name)	Bailum, Get Um	;	27
EPO Property Address – Street	Blank	;	28
EPO Address – City	Blank	;	29
EPO Address – State	Blank	;	30
EPO Address – Zip	Blank	;	31

**Charge003 Information:**

Field Name	Contents	Separator	Field #
Bar Code Record Type	Charge003	;	1
Offense Tracking Number (OTN)	760L0123110112M	;	2
Jurisdiction (City / County)	Richmond City	;	3
Court	GDC	;	4
Court Name	Blank	;	5
Court Address – Street or POB	10th and Decatur Streets	;	6
Court Address – City	Richmond	;	7
Court Address – State	VA	;	8
Court Mail Address – Zip	232211122	;	9
Hearing Court Type	C	;	10
Offense Date (YYYYMMDD)	20010918	;	11
Offense Date 2 (YYYYMMDD)	Blank	;	12
Offense Code Section	18.2-92	;	13
Offense Code Section Local	Blank	;	14
Class	F	;	15
Locality Type	C	;	16
Short Description (Of offense)	Breaking and Entering	;	17
Long Description (Of Offense)	Breaking and entering dwelling house with intent (etc)	;	18
Warrant Date (YYYYMMDD)	20010921	;	19
Complainant Name	Blank	;	20
Complainant Number	12347	;	21
Case Number	123456789ABCFDE	;	22
Hearing Date (YYYYMMDD)	20010924	;	23
Hearing Time (HHMM)	0900	;	24
Place Detained	Richmond City Lock Up	;	25
Arresting Officer Name	Oakley, Annie P	;	26
Attorney for Accused (Name)	Bailum, Get Um	;	27
EPO Property Address – Street	Blank	;	28
EPO Address – City	Blank	;	29
EPO Address – State	Blank	;	30
EPO Address – Zip	Blank	;	31

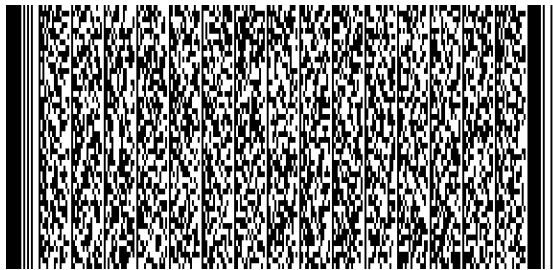
Proposed Sample of 2-D Bar Code  
Attachment Representing Charges  
from Three Warrants



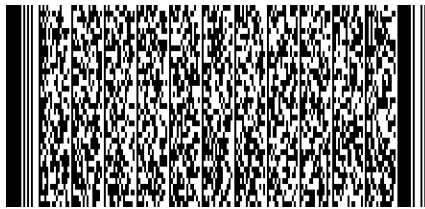
Public John, Q 1960/12/01; 5'10"; 200; W, M



123456789abcdef Johnny R Gotrocks



760L01231101087 18.2-48H1



760L0123110111H 18.2-51.2b



760L0123110112M 18.2-92

## Requirements to Read 2-D Bar Codes:

### 1. Hardware:

There are two types of readers which will process a 2-D Bar Code:

- a). Laser readers
  - i. These must be moved across the bar code to “read” the bar code (or the document moved under the reader). This movement may be manual manipulation by the operator (moving a hand held reader or moving the document with the bar code on it) or by some mechanical means within the reader itself.
  - ii. Laser readers do not have the capability of scanning images as can be done by an imager device.
  - iii. Laser readers are less expensive than imager units
- b). Scanner/Imager
  - i. Reads or scans the entire Bar Code at one time without any moving parts
  - ii. An actual imager (or camera) so, when connected via a PC's RS232 serial port, it can capture an image which might be a person or an object. (If installed as a Keyboard wedge it does not have the functionality of a camera)
  - iii. More expensive but not as easily damaged by abuse
  - iv. Does not require movement by the operator at a precise rate. Rather, simple presentation of the bar code to the properly aligned reader will produce a “good read”.

The two vendors who supplied readers for use in preparing this document were:

Welch/Allyn HandHeld Products

Model IT3800PDF which is a Linear CCD Device (\$295 with stand)

Model IT4410LR which is an Imager (\$625 with stand)

and

Symbol Technologies

Model LS4006i-1000 Laser Reader (\$529.19 with stand)

Model LS4006p-1000 Laser Reader (\$635 with stand)

Model VS4004-1000 Imager (\$1,043 without stand-n/a)

### **Features / Benefits of the Welch/Allyn IT4410LR:**

1. Placement of the Bar Code is not critical for the reader to read it
2. Unit is able to “work” while positioned in its stand (included in the price) allowing for a “hands-free” operation
3. Neither the Bar Codes nor the reader, have to be moved to be read or to read
4. Pricing is mid-range (\$295 – **\$625** – \$1,043) making it a very affordable unit for the many locations where it would be utilized
5. 3-year Depot labor, all labor and parts on Imager Reader, 1 year on cables
6. The reader stays “off” until a bar code is presented for reading
7. A single “programming” bar code can be created and included with each unit to establish a standard setup across the state and re-reading this bar code would reestablish this standard or default value
8. Capable of scanning 2D and 1D barcodes in a 360-degree rotational sensitivity presentation (bar code does not have to be held in a particular orientation to the reader)
9. Can scan up to a 45-degree viewing angle
10. IP52 rated (for exposure to Dust and Moisture)
11. Rated for 10 drops from 5 feet to concrete at room temperature
12. Can read in total darkness to 100,000 lux

Note: Welch/Allyn was founded in 1918 by William Noah Allyn and Dr. F. A. Welch , Welch Allyn Inc. has been a pioneer and leader in the design and of manufacture of high quality medical diagnostic instruments since its inception. Hand Held Products, Inc. has led in the design and manufacture of rugged, easy-to-use, portable data collection computers with integrated bar code scanners since 1982. Hand Held Products, a Welch Allyn Affiliate, was founded with the acquisition of Hand Held Products, Inc. by Welch Allyn Data Collection, Inc. (d/b/a Hand Held Products) in the summer of 1999.

### **Features / Benefits of the Symbol VS4004-1000 Imager:**

1. Very definitive “Cross Hairs” aiming light aids in proper alignment of reader to bar code
2. Capable of scanning 2D and 1D barcodes in a 180-degree rotational sensitivity presentation
3. Withstands multiple 4 foot drops to concrete
4. 12 month warranty
5. Ambient Light Immunity is 96,890 lux

Note: Symbol Technologies, Inc., founded in 1975, is a global leader in mobile data management systems and services with innovative customer solutions based on wireless local area networking for voice and data, application-specific mobile computing and bar code data capture. Symbol's wireless LAN solutions are



installed at more than 45,000 customer locations, and more than seven million Symbol scanners and application-specific scanner-integrated mobile computer systems are in use worldwide. Symbol and its global network of business partners provide solutions for retailing, transportation and distribution logistics, parcel and postal delivery, healthcare, education, manufacturing and other industries.

Product Data Sheets and Price quotes are included in Appendix A of this document.

### **Requirements to Generate 2-D Bar Codes:**

#### **1. Software / Programming**

While it is not a requirement of this project to produce "labels" with Bar Codes, it is necessary to produce, in a background mode, Bar Codes which represent the data contained in a warrant. To do this, some type of Application Programming Interface (API) software will be required. Most packages this researcher was able to uncover were designed for the production of "labels" and/or had a licensing structure that required the licensing of each PC or computer which would be producing the Bar Codes. However, one package enables a user such as the Supreme Court of Virginia or the Virginia State Police to develop their interface and "distribute" it without regard to the number of PCs or computers that are going to be using the distributed software.

This package is distributed by Symbol Technologies and is described in detail in Appendix B along with a quote for it as a Single User license and a Multi-user license. Sample program coding is included in Appendix B and a diskette can be made available which contains these samples electronically.

### **Requirements to Print 2-D Bar Codes:**

#### **1. Thermal Printers**

These are not really designed for printing on cut-sheet stock, 8-1/2 x 11 paper. Rather, they are used for production of Bar Code Labels on continuous-feed stock. Since the special characteristics of the Thermal Printers is not needed to meet the requirements of ICJIS, this researcher felt they were price prohibitive (\$2,000 - \$3,000 each) and, therefore, did not do any print testing with them.

2. Laser Printers

a) Manufacturers and Models  
Hewlett Packard 2200

This model was selected since it provides the capability to duplex print (printing on both sides of a page). While this is not a requirement for the 2-D Bar Code application, it is felt that the Supreme Court of Virginia would find this feature advantageous should they start printing Warrants on laser printers.

b) Price range is around \$800.00 including interface cables.

See Appendix C for a Data Sheet and Price Quote on the HP 2200d

Note: Bar codes were printed and subsequently read, using older technology printers as the **Hewlett Packard** IIIIP and 2100 laser printers. The newer technology of a **Hewlett Packard** 4550 laser printer and a **Brother** HL-1240 laser printer also handled the Bar Codes without any difficulties.

The 2-D Bar Code was also printed on a **Compaq** I600 InkJet printer and subsequently read without any problems.

These 2-D Bar Codes were encoded as Bit Map images using a Demo Software Program from Symbol Technologies.

## **Appendix A**

Bar Code Reader

Data Sheets

and

Price Quotes

# IMAGETEAM™ 4410 LR/LX

## Hand Held 2D Image Reader

The Hand Held Products IMAGETEAM™ (IT) 4410 Image Reader can be configured as either a hand held or fixed mount device that reads matrix, stacked linear, and conventional linear bar codes, as well as a single line of OCR-A and OCR-B fonts. Multi-line OCR applications can also be read. The IT4410 has the power to capture and download images to a PC for applications, such as signature capture, PC-based decoding, and image lift requirements.

The IT4410 Reader can be used in retail, packaging, transportation, printed circuit board manufacturing, electronic component manufacturing, and clinical/diagnostic applications that include test tube and reagent package labels.

The IT4410 can be configured for keyboard wedge, Non Decoded Output (Code 128 emulation), TTL RS-232, or True RS-232. The IT4410 connects to all popular PCs and portable data terminals. The Non Decoded Output mode can be used with external wedge decoders and portable terminals or other devices without 2D decoding capability.

The IT4410 features integrated processing for a one-piece scanning solution -- no additional boxes or electronics needed. The reader provides omni-directional and auto-discrimination decoding for symbologies, such as MaxiCode, PDF417, QR, Data Matrix, Aztec code, RSS code, composite codes, postal codes, Code 39, Code 93, Interleaved 2 of 5, Codabar, Code 128, UPC, and EAN. Additional symbologies will be added based on market demand.

Because the IT4410 is a fixed focus device, four product models with different focal points are available. The IT4410LX, designed for reading wide codes at up to 15 inches on PDF, has a focal point of 7 inches from the nose. It is ideal for reading the 1D and 2D labels found in the transportation industry. The IT4410LR, designed for low and medium

density codes, has a focal point of 5 inches from the nose. It is ideal for general 2D applications (postal, retail, and asset tracking). The high density (HD) models of the IT4410 are highlighted in a separate data sheet.



## Features & Benefits

### 2D Image Reader

Hand held or fixed mount image reader for reading and decoding 2D symbologies and capturing images.

### Supports All Popular 2D Symbologies

Fixed mount IT4410 supports all popular matrix and stacked linear symbologies: MaxiCode, Aztec, Aztec Mesa, Data Matrix, PDF417, QR, and MicroPDF417.

### Fixed Position Reader

Opens up new 2D bar code and image capture possibilities for fixed scanning applications.

### Omni-Directional Scanning

CMOS-based video technology and image processing gives the IT4410 full omni-directional scanning, even on linear codes, greatly simplifying operator training and increasing productivity.

### Aiming

The IT4410 has a bright, intuitive aiming line.

### Auto discriminates Between Supported Symbologies and Fonts

Reads all major linear, stacked linear, and matrix bar codes as well as machine readable fonts used in Optical Character Recognition (OCR).

# IMAGETEAM ä 4410 LR/LX

## Performance

LX Focal Point:

**7 inches from nose**

LR Focal Point:

**5 inches from nose**

LX Working Range:

12 pt OCR-A

10 mil Linear

13 mil UPC

15 mil Data

6.6 mil

10 mil

(typical)

12 cpi

(.025 cm)

(.033 cm)

Matrix

PDF

PDF

Near

**1.6 in. (4.1 cm)**

**2.1 in. (5.3 cm)**

**2.3 in. (5.8 cm)**

**3.7 in. (9.4 cm)**

**4 in. (10.2 cm)**

**2.7 in. (6.9 cm)**

Far

**12.3 in. (31.2 cm)**

**9.5 in. (24.1 cm)**

**13 in. (33 cm)**

**5.9 in. (15 cm)**

**6.3 in. (16 cm)**

**9.8 in. (24.9 cm)**

LR Working Range:

12 pt OCR-A

5 mil Linear

13 mil UPC

15 mil Data

6.6 mil

10 mil

Near

**1.9 in. (4.8 cm)**

**3 in. (7.6 cm)**

**1.9 in. (4.8 cm)**

**2.0 in. (5.1 cm)**

**2.7 in. (6.9 cm)**

**2.4 in. (6.1 cm)**

Far

**8.7 in. (22.1 cm)**

**4.3 in. (10.9 cm)**

**9.4 in. (23.9 cm)**

**5.8 in. (14.7 cm)**

**5.2 in. (13.2 cm)**

**7.7 in. (19.6 cm)**

Rotational Sensitivity:

**360°**

Viewing Angle:

**±45°**

Ambient Light:

**Total darkness to 100,000 lux (full sunlight)**

Aiming:

**660nm LEDs provide bright aiming line**

## Symbologies

2 Dimensional:

**MaxiCode, PDF417, MicroPDF417, Aztec, Aztec Mesa, Data Matrix, QR Code, Code 49, UCC Composite, Snowflake\*, Vericode\*, Dataglyphs\***

Linear:

**Code 39, Code 128, Codabar, UPC, EAN, I 2 of 5, RSS, BC 412\*, Code 93, Codablock**

**\* available to licensed users only**

Postal:

**Postnet (US), BPO4 State, Canadian 4 State, Japanese Post, KIX (Dutch Post), Planet Code**

OCR Fonts:

**OCR-A, OCR-B**

Interfaces:

**RS232, Wedge, and HHLC (Code 128 Emulation)**

Programmable

Options:

**Baud, Parity, Data Formatting, Code Options**

## Mechanical/Electrical

Dimensions

Length:

**6.1 in. (15.4 cm)**

Height

**5.6 in. (14.2 cm)**

Width:

**2.50 in. (6.4 cm)**

Weight w/o cord:

**7 oz. (198 g) or less**

Power Requirements:

**4 to 9 volts**

Current Draw:

**Lower Power Mode - average @ 5 VDC-40mA**

**Medium Power Mode - average @ 5VDC-125mA**

**High Power Mode - average @ 5VDC-175mA**

Standby Current:

**< 200µA @ 5V**

## Environmental

Temperature

Operating:

**-0 °C to 50 °C**

Storage:

**-40 °C to +70 °C**

Humidity:

**95% RH, non condensing at 50 °C**

Shock:

**10 drops 5 ft. to concrete @ room temperature**

ESD:

**Functional after 15KV discharge**

Agency:

**FCC Class B, CE**

Seal Rating:

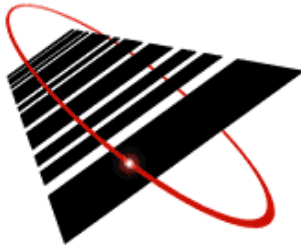
**IP52**

Complies with EMC 89/336/EEC and LVD 73/23/EEC

Web Site Address [www.handheld.com](http://www.handheld.com)

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Due to Hand Held Products' continuing product improvement programs, specifications and features herein are subject to change without notice.



**Barcoding.com**

December 13, 2001

Tom Wadkins  
Virginia Dept. Of Criminal Justice  
805 East Broad St.  
Richmond, VA. 23219

Dear Mr. Wadkins,

Per our discussion I have enclosed the following quotation,

Qty.	Description	Price Each
1	Hand Held Products Imagetech 4410 Hand Held 2D Image Reader Includes Reader, RS232 Cables and Power Supply. #4410LR-121CK	\$575
1	4410 Scan Stand for Hands Free Operation #44/47ScanStand	\$50

Quote Valid For 30 Days

Jay Davis  
Barcoding.com

## VS 4000 Series Specification Highlights



### Physical Characteristics

Dimensions:	6.3 in. H x 5 in. L x 2.8 in. W/16 cm H x 12.7 cm L x 7.1 cm W
Weight:	7.3 oz/205 gm (without cable)
Coil Cable Length	6ft/1.8m


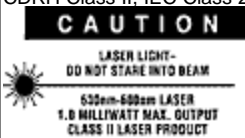
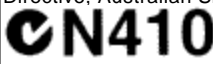
### Performance Characteristics

Field of View	32° horizontal/24° vertical
Focal Point:	Standard: 5.8 in./14.8 cm from nose of scanner High Density: 2.4 in./6.2 cm from nose of scanner
Sensor:	Progressive Scan CCD
Optical Resolution:	640x480 pixels x 256 shades of gray
Pitch:	+/- 60° (from front to back)
Skew:	+/- 60° from plane parallel to symbol (side-to-side)
Rotational Tolerance:	+/- 180°
Print Contrast Resolution:	25% (1D symbologies) or 35% (PDF417) absolute dark/light reflectance differential, measured at 650 nm
Aiming Pattern:	Visible laser diode at 650 nm
Ambient Light Immunity:	Sunlight: Up to 9,000ft-candles/96,890 lux
Shock:	Withstands multiple 4ft/1.2m drops to concrete
Power Requirements:	+4.75 to 5.25V, 400 mA (typical) Low Power Mode Current: 1.5 mA Normal Current: 400 mA Peak Current: 930 mA
Interfaces:	RS-232 and Synapse Smart Cable interface
Humidity:	5% to 70% noncondensing

## User Environment

Operating Temperature:	0° to 40° C/32° to 104° F
Storage Temperature:	-20° to 60° C/-4° to 140° F
Decode Capability:	1-D Symbology: UPC-A, UPC-E, EAN-8, EAN-13, Code 39, Code 39 Full ASCII, Trioptic Code 39, Code 93, UCC/EAN-128, Code 128, Codabar, Interleaved 2 of 5, Discrete 2 of 5, Bookland EAN, UPC Coupon Code, MSI Plessey, JAN, Italian Pharmacode 2-D Symbology: MaxiCode, QR Code, micro PDF417, PDF417, DataMatrix (ECC 200)
Postal Codes:	U.S., Australia, Canada, UK, Japan, Holland
Imaging Options (User Selectable):	File Formats: JPEG, TIFF, BMP Resolution: Full (640x480), 1/2, 1/3, 1/4 image Grayscale Level: 256, 16, 2, shades of gray Cropping: Any rectangular region of the image

## Regulatory

Electrical Safety:	Certified to UL1950, CSA C22.2 No. 950,  EN60950/IEC950 
Laser Safety:	CDRH Class II, IEC Class 2 
EMI/RFI:	FCC Part 15 Class B, ICES-003 Class B, European Union EMC Directive, Australian SMA 

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Wayne L. Brown II, M.B.A.  
Sales/Systems Integration  
Computer Pro's

10803 Sebring Drive  
Richmond, VA 23233  
Vce:804.370.3381 Fax:413-604-9586  
FIN: 54-1876356

## Estimate

DATE	12/04/2001
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NAME / ADDRESS
----------------

REP
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WLB
-----

ICJIS Project Virginia Department. of Criminal Justice Services Richmond, VA
--

DESCRIPTION	QTY	TOTAL
VS4004 IMAGER ESTIMATE VALID FOR 30-DAYS		
VS4004-I000, CCD Imager, 1D, 2D, no power-supply, no data cable, (\$1545.00 Retail)	1	929.00
		929.00
KEYBOARD WEDGE		
LS/VS 4000, Synapse 8' coiled cable, (\$28.00 Retail)	1	25.00
PS/2 keyboard wedge synapse adapter, (\$85.00 Retail)	1	74.00
		99.00
Pre-Stage each scanner for out-of-box usage	1	15.00

Prices here are very competitive. If you have a pricing issue, please call. Thanks !

Sales Tax	(4.5%) \$0.00
-----------	---------------

TOTAL	\$1,043.00
-------	------------

## **Appendix B**

Bar Code Reader

Application

Programming

Interface


Software

Description and Pricing

# Symbol Technologies, Inc.

## CONFIDENTIAL

### Product Marketing Bulletin



**Now with 32  
bit Support!**

PMB: 00315  
: July 2, 2000  
Contact: Barry Lenoble  
Phone: (631)738-5381

#### **PDF Encoder – adds PDF417 Printing to any Application**

##### **Overview**

With Symbol's PDF417 Encoder Application Programming Interface (API), software developers can add PDF417 printing capability to any DOS or Windows based application with minimal development effort. Fully compliant with the AIM PDF417 Universal Symbology Specification, the Encoder API facilitates the rapid, reliable encoding and printing of PDF417 in almost any application. And, for a one-time license fee, you can sell and distribute this capability as part of an application with no additional fees to pay.

As the benefits of 2-D applications are recognized by more and more users and industry standards organizations, the Encoder API represents an invaluable tool, not only for software developers but also for end users, system integrators and printer manufacturers.

The Encoder API package supports 'C' DOS development environments, as well as Microsoft Windows 16 and 32 bit development environments.

For those wishing to develop PDF417 in environments other than DOS or Windows, ANSI 'C' source code can be made available on a limited basis.

## **Key Features**

Key features of the Encoder API include:

- Full AIM USS compliance including Macro PDF
- Macro PDF support - This allows large data files to be encoded and printed using multiple PDF417 symbols.
- Micro PDF support – To encode a moderate amount of data in a very small area.
- Ease of interface - The Encoder API has a clean, well-defined interface designed for direct linking into existing applications.
- Speed - Symbol's 3rd generation product, the Encoder API, delivers sub-second encode performance.
- Variety of output formats - This enables virtually any application environment to be readily supported.
- Flexibility - Complete control is provided over all aspects of the printed symbol - shape, module size, error correction level, etc.

## **Key Users**

Key users for the Encoder API will include:

- Software developers, end users and system integrators wishing to print PDF to standard commercial printers, such as office lasers.
- Printer manufacturers seeking to integrate on-board PDF printing capabilities within their devices.

### **Product Description**

Symbol's Encoder API provides a simple, cost-effective means to implement the printing of PDF417 -- the first critical step in almost any application.

The PDF417 Encoder API is a complete implementation of the AIM USS specification for PDF417. It includes the following library formats:

- Windows 16 bit DLL or static library
- Windows 32 bit DLL or static library
- DOS 16 bit library

Sample applications in ANSI 'C,' Microsoft Visual 'C' and Microsoft Visual Basic for Windows are included in the package.

In addition to full compliance with the AIM specification, the API supports several output formats including:

- Windows BMP or DIB
- TIFF
- Encapsulated Postscript
- HP PCL and PCL5
- Epson 9 and 24 pin dot matrix
- Windows Metafile (WMF)
- PCX
- PS10XX

For debugging purposes, the Encoder supports two additional output formats: 'codeword' and 'bar-space pattern.' Codeword output will display ASCII sequences of codeword values, i.e. 000 435 234 ... Bar space pattern output will display ASCII bar space run lengths, i.e. 8111113...

Using the API, applications print PDF417 by selecting an output format, encoding the data, and printing the resulting image.

Symbol's implementation of the PDF417 specification offers developers a flexible set of functions for setting PDF417 encoding options. The following options are supported:

- User defined error correction level:
  - From 0 to 8 or
  - As a percentage of overall data
- Symbol size:
  - Height and width as a ratio or
  - Height in rows or
  - Width in columns
- Pixel shaving (bar width / height reduction):
  - Reduces ink spread in either bar width or height
- Full Macro PDF support
- Full Micro PDF support:
  - Use standard PDF417 data and error correction codewords with unique row indicator columns which are about half the width of a PDF417 data codeword. MicroPDF row address patterns are about one quarter the size of a standard PDF417 start/row-indicator combination. This is why the MicroPDF symbol is so much smaller than the standard PDF in the horizontal direction.

## **Memory Requirements**

The Encoder's memory requirements vary based on the options required by the application. The following table illustrates the memory requirements for an application requiring all of the PDF Encoder's features.

<b>Module</b>	<b>Code Space</b>	<b>Data Space</b>
PDF Encoder	13.3K	18.3K
Macro PDF	3.0K	4.2K
Bar Space / Codewords	1.6K	40 Bytes
Imaging support*	6.3K	3.6K
DIB output**	1.1K	0K
TIFF output**	0.8K	0.2K
EPS output**	3.1K	0.4K
PCL output**	2.2K	40 Bytes
Epson 9 and 24 pin output	2.2K	40 Bytes
PCX output**	0.9K	0K
PS1000 output**	1.8K	0K
<b>Total</b>	<b>36.3K</b>	<b>26.7K</b>

\* Required for applications needing image format support. Not required for bar-space pattern or codeword output.

\*\* Requires imaging support

If an application only needs, for example, to encode non Macro PDF symbols on an HP PCL printer, the memory requirements would be:

<b>Module</b>	<b>Code Space</b>	<b>Data Space</b>
PDF Encoder	13.3K	18.3K
Imaging support	6.3K	3.6K
PCL output	2.2K	0K
<b>Total</b>	<b>21.8K</b>	<b>21.9K</b>

## **Pricing**

### **PDF Encoder API**

Symbol offers its PDF Encoder API with two licensing options as follows:

- Single System License

Designed primarily for end users wishing to generate and print PDF417 symbols on a single machine. Please see attached shrink-wrap license for detailed licensing terms.

<b>Part Number</b>	<b>Description</b>	<b>Price</b>
SW-11970-04	PDF Encoder API	\$295.00

- Multi-System License

Designed for software developers, system integrators and end users wishing to generate and print PDF417 on multiple systems. Please see attached shrink-wrap license for detailed licensing terms.

The multi-system license enables applications incorporating the Encoder API to be sold, distributed and used on multiple systems with no further payment required.

Software developers or system integrators with multiple development sites are required to purchase a separate multi-system license for each development site.

<b>Part Number</b>	<b>Description</b>	<b>Price</b>
SW-15857-03	PDF Encoder API	\$3495.00

Please note that the Encoder API may not be used to build a product which substantially duplicates the functionality and/or appearance of the Encoder API itself. The API may not, for example, be slightly modified and then sold as a general purpose PDF encoder library.

Please also note that no charge is made for the use of the PDF417 symbology itself. This is in the public domain. Licensing is for the specific Encoder API software package which Symbol has developed. Customers using bar code printers with on-board PDF capability will not require the Encoder API.



## **PDF Encoder API support**

The PDF417 Encoder API is now supported through the "Symbol Developer Programme". The program includes support for both encoder licenses.

You can register for this programme via phone, fax, or mail.

Mail:        Symbol Developer Programme  
              Symbol Technologies, Inc.  
              One Symbol Plaza  
              Mailstop: A-9  
              Holtsville, NY 11742

Tel:         1-888-559-6621

Fax:         1-631-738-4621

### **Cost Information**

Individual Membership:	US \$595.00
	Three incidents (cases) included
	CD-ROM three times a year
Membership period:	12 months
Additional Support Package:	US \$400 for a three-pack
	of incidents (cases)

### **Further information**

- For North America:
  - Call PDF Professional Services at 1-800-927-2626 Ext 4417
- For Support in Other Countries:
  - Call PDF Professional Services at 32 2 352 1211 Ext 204

### **Availability**

The Encoder API can be ordered through your normal channel, and is available today. It is delivered as a shrink-wrapped package, complete with documentation.

## Example Code Visual Basic example

```
*****
'
' Simple example of PDF Encoder API usage in Visual Basic
'
' Copyright (c) 2001 Symbol Technologies, Inc.
' Advanced Data Capture Group - æ
'
*****

Private Sub cmdRunSample_Click()
    'Create some sample data to encode
    Dim strSampleData As String
    strSampleData = "Symbol Technologies, Inc."

    'Initialize the encoder
    PDFSetDefaults
    PDFSetECCPercent 15 'Set the error correction overhead to 15%
    PDFSetAspect "1:3.25" 'Set the bar code aspect ratio for a wide symbol

    'Initialize the output formatter(driver) to a Window's .BMP (100 DPI, 10 MIL)
    PDFOutputAsDIBFile DPI_100_AT_10MIL, ROTATE_0

    'Create a PDF Encoder input object
    Dim objIn As PDFOBJ
    MakeMemoryObject objIn, PDFINPUT, strSampleData

    'Encode the data
    If (PDFEncode(objIn, Len(strSampleData)) = STATUS_ENCODEOK) Then
        Dim objOut As PDFOBJ
        Dim nOutputLen As Long

        'Create a PDF Encoder file output object
        If (MakeFilenameObject(objOut, PDFOUTPUT, "PDF417.BMP")) Then
            'Render the bar code image
            If (PDFMakeImage(objOut, nOutputLen) = STATUS_RENDEROK) Then
                MsgBox "The sample data was successfully encoded in 'PDF417.BMP'" + vbCrLf + "File size : " +
                Str(nOutputLen), vbOKOnly
            Else
                MsgBox "PDFMakeImage Error", vbExclamation + vbOKOnly
            End If
        Else
            MsgBox "MakeFilenameObject Error", vbExclamation + vbOKOnly
        End If
    Else
        MsgBox "PDFEncode Error", vbExclamation + vbOKOnly
    End If
End Sub
```

## Example Code      ANSI 'C' example

```
/*
 * Very simple example of PDF Encoder API usage
 */
#include <stdlib.h>
#include <stdio.h>
#include <string.h>

#include "pdfapi.h"

static char abData[] = "Symbol Technologies, Inc.\n";

int main( int argc, char *argv[] )
{
    PDFObject objIn;
    /*
     * Setup the encoder library to our liking
     */
    PDFSetDefaults();
    PDFSetECCPercent( 15 ); /* ~15% codeword overhead for error control */
    PDFSetAspect( "1:3.25" ); /* barcode aspect ratio -- wide symbol */
    /*
     * Setup the output formatter (driver) - Windows bitmap (100 DPI, 10 mil)
     */
    PDFOutputAsDIBFile( DPI_100_AT_10MIL, ROTATE_0 );
    /*
     * Setup the source for data to be encoded...and encode it
     */
    MakeMemoryObject( &objIn, PDFINPUT, abData );
    if ( PDFEncode( &objIn, (PDFSZET)strlen(abData) ) == STATUS_ENCODEOK ) {
        PDFObject objOut;
        PDFSZET nOutputLen;
        /*
         * Associate the image output with a named file: PDF417.BMP
         */
        if ( MakeFilenameObject( &objOut, PDFOUTPUT, "pdf417.bmp" ) ) {
            /*
             * Render the barcode image
             */
            if ( PDFMakeImage( &objOut, &nOutputLen ) == STATUS_RENDEROK )
                printf( "Encode successful! (file length: %ld)\n", nOutputLen );
            else
                printf( "PDFMakeImage error\n" );
        }
        else
            printf( "MakeFilenameObject error\n" );
    }
    else
        printf( "PDFEncode error\n" );
    return 0;
}
```

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Wayne L. Brown II, M.B.A.  
Sales/Systems Integration  
Computer Pro's

# Estimate

10803 Sebring Drive  
Richmond, VA 23233  
Vce: 804.370.3381 Fax: 413-604-9586  
FIN: 54-1876356

DATE	12/18/2001
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NAME / ADDRESS
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REP
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ICJIS Project Virginia Department of Criminal Justice Services Richmond, VA
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WLB
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DESCRIPTION	QTY	TOTAL
ESTIMATE VALID FOR 30-DAYS		
MULTIPLE SYSTEMS		
PDF417 Encoder API Designed for software developers, system integrators and end users wishing to generate and print PDF417 on multiple systems, (\$3495.00 Retail)	1	2,999.95
SINGLE SYSTEM		
PDF417 Encoder API Designed for end users wishing to generate and print PDF417 symbols on a single machine, (\$295.00 Retail)	1	260.00

Prices here are very competitive. If you have a pricing issue, please call. Thanks !

Sales Tax	(4.5%) \$0.00
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TOTAL	
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**Appendix C**  
**Laser Printer**  
**Specifications**  
**and**  
**Pricing**

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## Hewlett-Packard 2200 Series Laser Printer

### Technical Specifications

#### HP LaserJet 2200 series printers

##### General Features

19 ppm  
133 MHz RISC microprocessor  
Instant-on fuser provides first page out in less than 15 seconds (simplex), less than 26 seconds (duplex)  
Up to 40,000 pages-per-month duty cycle  
True 1200 dpi at engine speed  
HP PCL 6, HP PCL 5e, PostScript Level 2 emulation  
Straight-through paper path  
Memory 8 MB RAM (2200d, 2200dse, 2200dt, 2200dn) or 16 MB RAM (2200dtn); expansion up to 64 MB (2200d, 2200dse, 2200dt, 2200dn) or expansion up to 48 MB (2200dtn); 72 MB total using 100-Pin SDRAM DIMMs  
Memory Enhancement technology (MEt)  
Microsoft Windows: 95/98, NT 4.0, 3.1x (PCL 6), 9x, 2000, ME, Macintosh System 7.5.5 and above  
supported IBM OS/2 and UNIX/LINUX drivers can be downloaded from the Web

##### Resolution

HP Prores 1200 (True 1200 dpi at engine speed)  
HP Fastres 1200\*\* (1200 dpi like quality at up to 19 ppm letter)  
Economode 600 dpi (50% toner savings)  
\*\*Default setting

##### Paper Handling

Built-in duplex capability for two-sided printing  
Standard output capacity of 150 sheets (face-down)  
Straight-through paper path  
Paper input level indicators  
Optional 250-sheet input tray/feeder supports letter, A4, executive, A5, B5 (ISO), B5 (JIS), legal, and 8.5 x 13 in  
Optional 500-sheet input tray/feeder supporting letter and A4 sizes only

##### HP LaserJet 2200d and 2200dn and 2200dse:

Tray 1: 100-sheet/10 envelope multipurpose tray for automatic and manual feeding of envelopes, labels, transparencies and other special media (3 x 5 inches to legal size)  
Tray 2: 250-sheet input tray that supports letter, A4, executive, legal, B5 (ISO), B5 (JIS), A5 and 8.5 x 13 in.

##### HP LaserJet 2200dt:

Tray 1: 100-sheet/10 envelope multipurpose tray for automatic and manual feeding of envelopes, labels, transparencies and other special media (3 x 5 inches to legal size)  
Tray 2: 250-sheet input tray that supports letter, A4, executive, legal, B5 (ISO), B5 (JIS), A5 and 8.5 x 13 in.  
Tray 3: 250-sheet input tray that supports letter, A4, executive, legal, B5 (ISO), B5 (JIS), A5 and 8.5 x 13 in.

##### HP LaserJet 2200dtn:

Tray 1: 100-sheet/10 envelope multipurpose tray for automatic and manual feeding of envelopes, labels, transparencies and other special media (3 x 5 inches to legal size)  
Tray 2: 250-sheet input tray that supports letter, A4, executive, legal, B5 (ISO), B5 (JIS), A5 and 8.5 x 13 in.  
Tray 3: 500-sheet input tray/feeder supporting letter and A4 sizes only

##### Media Types

Paper, envelopes, transparencies, card stock, postcards, labels, and recycled paper  
Tray 1: Handles 16 to 43 lb (60 to 163 g/m<sup>2</sup>) stocks, envelopes, transparencies, and labels designed for laser printers; all other trays handle 16 to 28 lb (60 to 105 g/m<sup>2</sup>) stock;  
Envelopes: Typical capacity of 10 in tray 1

##### Print Orientation

Portrait, landscape, and reverse landscape; N-up printing;  
Binding options: 2, 4, 6, 9, 16 pages per sheet; Booklet printing with duplex on

##### Font Capabilities

HP PCL 6: 45 scalable TrueType fonts and one bitmapped line printer font built-in  
PostScript Level 2 emulation: 35 scalable PS language fonts built-in; Intellifont and TrueType rasterizer built into HP PCL 6; HP FontSmart software provides simple font management

##### Network Connectivity

One bi-directional parallel port (IEEE 1284 ECP-compliant, B-size); One USB port; One open Enhanced Input Output (EIO) slot for optional HP Jetdirect 610N (EIO) internal print servers for Ethernet 10Base-T, 10Base2, 100Base-TX, LocalTalk, and Token Ring networks;  
One fast wireless infrared port (IrDA compliant); HP Jetsend enabled via the built-in Fast Infrared port only, automatic language switching; IR Ready 2000; OBEX via IRDA-compliant Fast Infrared (FIR) port  
HP LaserJet 2200dn and 2200dtn printers: only: One HP Jetdirect 610N (EIO) internal print server for Ethernet 10/100Base-TX network environments (RJ-45 port); Automatic protocol switching for sharing printers in mixed-network environments; HP Web Jetadmin requires installation on one of the following network servers: Microsoft Windows NT, IBM OS/2 Warp, HP-UX, or Solaris  
HP Jetdirect 610N (EIO) internal print servers support all major network operating systems and provide flash memory for future upgrades  
HP Web Jetadmin printer management software; Internet software disk replication utility; HP Internet Installer; SNMP and industry standard printer MIB compliant for network management compatibility

## Hewlett-Packard 2200 Series Laser Printer

### Environmental Ranges

Operating temperature: 15 to 32.5° C (59 to 89° F)  
Storage temperature: -20 to 40° C (-4 to 104° F)  
Operating humidity: 10 to 80% RH non-condensing  
Storage humidity: 10 to 90% RH non-condensing

### Power Requirements

Source: 100 to 127 volts ( $\pm 10\%$ ),  
or 220 to 240 volts ( $\pm 10\%$ )  
Frequency: 50 or 60 Hz ( $\pm 3$  Hz)  
Source: Printers voltage ranges depend upon the country  
in which the printer is purchased  
Minimum recommended circuit capacity: 5 Amps (110V)  
and 2.5 Amps (220V)

### Power Consumption

HP LaserJet 2200 series printers  
(average for 110V Models):  
Printing: 400 watts  
Standby (ready state): 12 watts  
ENERGY STAR compliant  
Powersave mode: 12 watts  
Off mode: = 0 W  
Minimum Circuit Capacity:

HP LaserJet 2200 series printers  
(average for 220V Models):  
Printing: 400 watts  
Standby: 12 watts  
Powersave: 12C watts  
Off = 0 W

### Dimensions (w x h x d)

HP LaserJet 2200d, 2200dse, and 2200dn printers  
16 x 10 x 17.1 in (405 x 255 x 435 mm)

HP LaserJet 2200dt printer  
16 x 13.2 x 17.1 in (405 x 334 x 435 mm)

HP LaserJet 2200dtn printer  
16 x 15.6 x 17.1 in (405 x 395 x 435 mm)

250-sheet tray/feeder  
16 x 3.2 x 17.1 in (405 x 79 x 435 mm)

500-sheet tray/feeder:  
16 x 5.6 x 17.1 in (405 x 140 x 435 mm)

### Weight

HP LaserJet 2200d, 2200dse, and 2200dn printers:  
29 lbs (14 kg)  
HP LaserJet 2200dt printer:  
35.9 lbs (17.1 kg)  
HP LaserJet 2200dtn printer:  
39.4 lbs (18.7 kg)  
250-sheet tray/feeder: 6.9 lbs (3.1 kg)  
500-sheet tray/feeder: 10.4 lbs (4.7 kg)

### Product Certifications

Carries CE marking for EU EMC and Low Voltage Directives. Complies with IEC60950/EN 60950 and IEC 60825-1/EN 60825-1 (Class 1 Laser product/LED product); FCC Class B and CISPR-22 Class B; CDRH certified Class 1 Laser product (safe for office/EDP use); TUV-GS approved; EPA Energy Star® compliant, Blue Angel compliant

### Acoustics

Operating position:  
LpAm = 58 dB (A) printing,  
LpAm = 0 dB (A) idle/powersave\*

Bystander position:  
LpAm = 51 dB (A) printing

Sound power:  
LwAd = 6.6 bels (A) printing

\*Acoustics are inaudible during powersave mode  
Tests per ISO 9296

### System Requirements

Windows 95/98: IBM-compatible PC  
with Pentium 90 MHz processor and 32 MB of RAM;  
Windows NT 4.0: IBM-compatible PC  
with Pentium 90 MHz processor and 64 MB of RAM;  
Windows 2000: IBM-compatible PC  
with Pentium 300 MHz processor and 64 MB of RAM;  
Windows Me: IBM-compatible PC  
with Pentium 150 MHz processor and 64 MB of RAM;

Plus: 15 MB of free hard disk space, CD-ROM disk drive,  
either a USB port or a dedicated IEEE-1284 compliant bi-  
directional parallel port for direct connections; Compatible  
HP Jetdirect print server for network connections included  
on the HP LaserJet 2200dn and 2200dtn models

### Warranty

1-year return to HP/dealer  
(Express exchange in the U.S. and Canada only)  
Enhance/upgrade basic warranty with options that  
included 1-5 year return to HP or onsite warranties

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10803 Sebring Drive

Richmond, VA 23233

Vce:804.370.3381 Fax:413-604-9586

FIN: 54-1876356

# Estimate

DATE

12/20/2001

## NAME / ADDRESS

Attn: Tom Wadkins

VA Dept. of Criminal Justice

Richmond, VA

REP

WLB

DESCRIPTION	QTY	TOTAL
ESTIMATE VALID FOR 30-DAYS		
1 EACH C7058A, HP2200dse Laserjet B/W Printer, 19ppm, 1200x1200dpi, 100sht MP Tray, 250sht Tray, 8mb RAM, auto-duplexing, 40,000 sht/per/mth, Toner, Software, Power Cord, NO Interface Cable, 1yr. mfg. warranty, (\$999.00 Retail)	1	778.67
C2951A, HP IEEE-1284 printer interface cable, 3 meters	1	19.00
		797.67
Prices here are very competitive. If you have a pricing issue, please call. Thanks !		
Sales Tax		\$0.00
TOTAL		\$797.67

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FIN: 54-1876356

# Estimate

DATE

12/20/2001

## NAME / ADDRESS

Attn: Tom Wadkins

VA Dept. of Criminal Justice

Richmond, VA

REP

WLB

DESCRIPTION	QTY	TOTAL
ESTIMATE VALID FOR 30-DAYS		
100 UNIT VOLUME PURCHASE		
C7058A, HP2200dse Laserjet B/W Printer, 19ppm, 1200x1200dpi, 100sht MP Tray, 250sht Tray, 8mb RAM, auto-duplexing, 40,000 sht/per/mth, Toner, Software, Power Cord, NO Interface Cable, 1yr. mfg. warranty, (\$999.00 Retail)	100	76,616.41
C2951A, HP IEEE-1284 printer interface cable, 3 meters	100	1,700.07
		78,316.48
Prices here are very competitive. If you have a pricing issue, please call. Thanks !		
Sales Tax		\$0.00
TOTAL		\$78,316.48